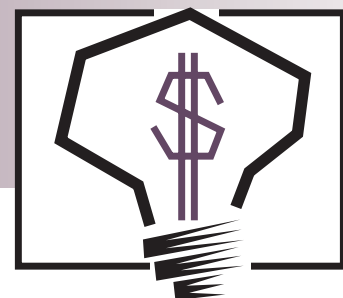


INVENTIONS & INNOVATION

Success Story



WELDCOMPUTER® RESISTANCE WELDER ADAPTIVE CONTROL

Sophisticated Welding Control System Saves Energy, Improves Quality, and is Affordable for General Industrial Use

Benefits

- ◆ Reduces energy use for resistance welding by precise control of electric current
- ◆ Reduces the number of rejected welds and eliminates the need for destructive weld testing, saving money, materials, and energy
- ◆ Results in productivity gains of 90% to 200% because of decreased welding times and a 55% reduction in scrap material costs because of improved welding accuracy
- ◆ Allows more effective use of resistance welding, which is less expensive, faster, more reliable, and less energy intensive than other joining methods
- ◆ Measures both frequency and voltage of available electrical current, then precisely regulates voltage to make resistance welding an exact, high-quality process
- ◆ Performs real-time diagnostics during each weld, precisely regulates voltage to ensure a high-quality process, and documents weld integrity.

Applications

Used in the aerospace, defense, automotive, and appliance industries, and in general commercial manufacturing areas.

"Our WeldComputer systems were sold primarily to the aerospace and defense industries. Now, with help from the I&I program, we have expanded our product line so that half of our sales are to general commercial industries."

— Dennis Hull
Chief Operating Officer
WeldComputer Corporation

Welding is one of the most common manufacturing operations, and resistance welding is one of the oldest and most common ways of welding. Until recently, however, resistance welding—a function of physical electrode force; material thickness and resistance; and time, frequency, and voltage of the electric current—was more of an art than a science. Because the standard way to test a weld is to stress it until it breaks, manufacturers such as automakers often overweld to avoid testing the weld. And, with the thinner steels now used for cars and other products, spot welding is becoming more difficult.



WeldComputer Resistance Welder Adaptive Control



Technology Description

With help from the U.S. Department of Energy's Inventions and Innovation Program, WeldComputer Corporation has changed resistance welding to a science and made the technology available to general commercial industries. The WeldComputer Resistance Welder Adaptive Control offers a way to meet these challenges by providing precise, effective welds and documenting weld integrity. The development and introduction of the less-expensive L-Series systems made the technology more affordable and extended the client base to more general commercial operations. The welding system performs real-time diagnostics during each weld, automatically adjusting the welding voltage to match the materials being joined and documenting the integrity of each weld. This process allows a more effective use of resistance welding, which is less expensive, faster, more reliable, and less energy intensive than other joining methods.

System Economics and Market Potential

WeldComputer's system designers have produced a more affordable Resistance Welder Adaptive Control. The objective of the L-Series control project was to reduce costs. Costs were reduced by decreasing component costs and adaptive capabilities and by using multi-channel versions. An unanticipated benefit of the new series was improved welds made using significant power line frequency variation—a situation common in many developing and some developed countries.

Resistance welding can be used wherever relatively thin metal sheets need to be joined. The sophisticated adaptive controls of WeldComputer were already ideal for stringent quality control situations, like those found in the aerospace and defense contract industries. Capital investment cost was the primary deterrent to general commercial use of the adaptive control for products such as automobiles (5,000 to 10,000 spot welds per car) and appliances. With the reductions in the effective cost of the system achieved with this project, WeldComputer Corporation now sells approximately half of its adaptive control systems to general commercial industries. The L-Series controls are cost competitive, and the cost of the adaptive control has been reduced enough to make it attractive for automotive manufacturing and other general commercial use.

WeldComputer Corporation manufactures a wide range of controls and monitors for the resistance welding industry. Using proven technology developed over the past two decades, the company's products afford welders the opportunity to monitor welding processes, take corrective actions to reduce the effects of process variations as the welds are being made, and archive the results. The WeldComputer Resistance Welder Adaptive Control is now saving energy and reducing losses due to substandard welds for automotive, appliance, and other manufacturers as well as in the aerospace industry.



The Inventions and Innovation Program works with inventors of energy-related technologies to establish technical performance and to conduct early development. Ideas that have significant energy-savings impact and market potential are chosen for financial assistance through a competitive solicitation process. Technical guidance and commercialization support are also extended to successful applicants.

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